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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/530,704	04/08/2005	Wei Wu	6187-000001/US	7743

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EXAMINER	
VALONE, THOMAS F	

ART UNIT	PAPER NUMBER
2858	

DATE MAILED: 09/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/530,704	WU, WEI	
	Examiner	Art Unit	
	Thomas F. Valone	2858	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *05 July 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) *7-11* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6 and 12-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 July 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1 - 6 and 12 - 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schaefer (5,446,393) in view of Mayor (6,700,388) and Silvester.

Regarding claims 1 - 4, 12, 13, Schaefer teaches a method for measuring electrical signals with a probe 20, with contact pin 19, that enables the acquisition, through a connection to a measurement device (electrical test instrument, col. 5, line 9 and col. 2, line 41), of a set of time-domain waveforms from a group of test points on an equipment under test (EUT) (test point on electrical assembly, col. 5, line 10 and col. 3, lines 5 - 23). Schaefer includes a coaxial shielded cable probe modification for high frequency signal isolation (col. 5, line 55), eliminating EMI from sources other than the point under test (col. 5, line 64). Schaefer also indicates a voltage signal waveform (col. 5, line 63) as in claims 3 and 12.

Schaefer does not explicitly specify the equal spacing of the test points nor the numbering of the test points. Schaefer does not address the converting, comparing, analyzing, specifying a frequency of the waveforms, or finding out the position of the maximum EMI.

Mayor, from the same field of endeavor, teaches the acquiring or obtaining of a set of time domain waveforms (analog input signal received, col. 5, line 25) from an equipment under test (electronic device under test, col. 5, line 26) via a "conductor, such as a wire or cable" (col. 5, line 29) as well as converting (transforms into frequency domain, col. 3, lines 50-55), comparing (col. 5, line 3), and analyzing (col. 4, line 44) the waveforms, and specifying a frequency (col. 8, line 35), the test point bearing the maximum value (measured peak voltage, col. 10, line 45) under a specified EMI frequency (selected frequency sub-band, col. 10, line 30), being the location of the EMI source (indicative of the EMI, col. 10, line 46). Mayor also identifies the time domain waveform possessing a voltage amplitude (108 in Fig. 4) as in claims 3 and 12.

Schaefer as modified by Mayor does not explicitly disclose a group of equally distributed test points on an EUT where the test points are well-numbered nor finding out the position of the maximum EMI amplitude.

Silvester teaches the application of finite element analysis to electrical fields, including one, two and three dimensions. The well-known process of performing the simulation analysis, with or without software, involves equally spaced elements ("same size," p. 5 and "equal length," p. 13) that are well-numbered, which also can be made as small as a point if desired (p. 7, line 3 - 5), in order to find the points exhibiting peak EMI voltage, as known to those skilled in the art. This is also relevant to acquisition produced from an "electronic design software system" as in claims 4 and 13, in light of the specification where the option of simulating the EUT with software is evidently claimed as an alternative to physically testing the equally spaced test points (instant

specification, p. 2, line 13). Silvester further teaches the standard calculus method for finding out the position of maximum EMI voltage amplitude, as in claim 2. Presenting an interchangeable method, Silvester identifies the step of taking the derivative of the voltage with respect to distance (p. 9-10), which is then set equal to zero for finding out the local maximum, as is known to those skilled in the art.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used Schaefer's EMI probe with a measurement device to acquire a set of time-domain voltage waveforms from test points on an EUT with Mayor's method and apparatus for EMI measurement to convert (process by transform), compare, and analyze the waveforms, since Mayor indicates a wire or cable input (col. 5, line 29) which normally requires a probe, to one skilled in the art to which this invention pertains, with Silvester's teachings of the technique and reason for testing a group of equally distributed test points with test points well-numbered and taking the derivative of the voltage for the purpose of finding out the position of the maximum EMI amplitude and to find out the location of the EMI source.

Regarding claims 5, 6, 14 and 15, the teachings of Schaefer are reviewed above.

Schaefer does not teach the use of a Fourier transform or a Short Time Fourier Transform.

Mayor teaches the use of a Fourier transform (col. 3, line 52) for transforming the time-domain signals into frequency domain signals, as in claims 5 and 14 and also preferably a fast (short time) Fourier transform (col. 7, line 37) as in claims 6 and 15.

Schaefer as modified by Mayor does not include the testing of equally spaced test points that are well-numbered, as applied to claim 1.

Silvester's teachings are reviewed above.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used Schaefer's EMI probe with a measurement device to acquire a set of time-domain voltage waveforms on an EUT with Mayor's method and apparatus for EMI measurement to convert (process by Fourier transform or short time Fourier transform), compare, and analyze the waveforms, since Mayor indicates a wire or cable input (col. 5, line 29) which normally requires a probe and Silvester teaches the reason for using a group of equally distributed test points with test points well-numbered, to one skilled in the art to which this invention pertains, for the purpose of finding the location of the EMI source.

Response to Arguments

3. In response to amendments to the claims, drawings and specification, objections to the claims, drawings and specification are withdrawn.

4. Applicant's arguments filed 7/5/06 have been fully considered but they are not persuasive. The argument that Schafer does not disclose how to test EMI is moot since the examiner has not relied on this reference for teaching the claimed processing steps for testing EMI. Regarding a "measurement device" in claims 4 and 13 as the means for the claimed "acquiring" of voltage measurements from points on a circuit board, Schafer's probe provides a structural equivalence and identical capability for the claimed process of acquiring a set of time-domain waveforms from a group of test

points, but also teaches a measurement device with coaxial shielding that prevents spurious ambient signals from creating false EMI signals (col. 5, line 63), which also seems to be overlooked or ignored in the instant application.

5. Regarding the argument concerning claim 1 addressing how to locate the source of EMI under a specified frequency, the prior art of Mayor performs the same Fourier transform method as the claimed invention, with much greater precision than the instant application. Unfortunately, applicant's claim 1 as well as Figure 2 and Figure 3 give no specific information about bandwidth or significant digit accuracy for what the applicant believes is a "specified frequency." In contrast, Mayor teaches what is well known in the art to which this invention pertains: in reality, there is actually no such thing as a specified frequency – there are only varying degrees of approximation within an acceptable error tolerance. To illustrate Mayor's process of specifying a frequency, and the value of his bandwidth method, his equipment digitizes a "specified frequency" of 20.48 MHz but then demonstrates the further refinement necessary, even for his four digit accuracy, by varying the specified frequency within three more digits of accuracy by indicating 312.5 Hz bins for test purposes, as his final acceptable limit of precision for the "specified frequency." In other words, Mayor teaches that the specified frequency is only as good as the equipment and can actually be continually split into smaller bins for test purposes, if the DFT software is capable of it, based on the sampling rate (col. 8, line 15-37).

The value and importance of Mayor's teaching cannot be overemphasized. The applicant's claims and corresponding disclosure imply that there is a perfect "specified

frequency" that can be defined with infinite accuracy but is silent about the tolerances or limits of such a measurement. Mayor instead demonstrates that a specified frequency can only be defined by further refinement with bins of smaller or lower frequency values and creates an impressive eight (8) or nine (9) digit accuracy in the above example. As a further example of specific frequency consideration, Mayor's teaching about a signal phasor (col. 8, line 54) is also necessarily defined at a particular specified frequency, as is well known in the art. Therefore, the rejection using Mayor as prior art is proper because it reads on claim 1.

6. Regarding the arguments about Silvester's finite element analysis and its method of equally spaced elements that can be used "for the purpose of MCI (?) measuring as recited in claim 1" of the present invention, the technique of finite element analysis is in agreement with the claimed concept of the elements being in mathematical order and being in the same line. Silvester's teachings are well known in the engineering art where the finite elements can be of equal spacing for comparison (p. 13). Since the applicant's argument refers to Silvester's one-dimension example in Chapter 1, it is important to realize that in one-dimension, the elements must be "in the same line." The Silvester textbook further includes another level of complexity where two-dimensional finite element matrices are taught (p. 112) and where transverse electromagnetic waves (TEM) are treated (p. 114), which reads on the present claimed invention for equably spaced test points on a two-dimensional circuit board, since EMI consists entirely of TEM. Regarding the elements being in "mathematical order," this feature is not claimed but Silvester still encompasses its intent with sequential ordering and numbering of the

elements (p. 5), providing an identical function that addresses the argument for mathematical order.

7. The applied references are combinable, since Silvester teaches finite element analysis as applied to electrical signal analysis on a two-dimensional circuit board, which must necessarily include EMI testing. Silvester is from the same field of endeavor and thereby combinable with Mayor's EMI testing and analysis technique and Schaefer's testing device for any operating semiconductor circuit board, thus meeting the conditions for obviousness.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Translation of JP2002257881 of record teaches measurement of the EMI at measuring points at a prescribed specific frequency. Silvester additional pages provide examples of two-dimensional, equally spaced elements for electrical testing and analysis.

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas F. Valone whose telephone number is 571-272-8896. The examiner can normally be reached on 10-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Hirshfeld can be reached on 571-272-2168. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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